relatively high in the rural areas, then such a policy has the undesirable effect of discouraging entry into these areas by forcing the regulated firm to charge relatively less profitable rates in these localities. That is, if prices are the same in all areas and costs are not, then holding price equal to average cost guarantees that certain areas will be unprofitable and, therefore, unattractive to enter. Consequently, the relatively large market share that AT&T continues to enjoy in the rural areas may well be the manifestation of regulatorily induced incentives that discourage the alternative carriers from entering these areas.[15] Thus, the existing policy may be preventing the very entry that regulators require in order to justify eliminating this policy.

The instinctive rationalization that is supposed to justify this policy is that it is serving to promote competition by protecting the newer firms that have entered the market from potentially aggressive pricing by AT&T. This line of reasoning, however, fails to make the important (indeed, crucial) distinction between competition and competitors. The former is a dynamic process whereby firms prosper or die according to the efficiency with which they satisfy society's wants. The latter is simply a group of firms whose managers may or may not be making investment and pricing decisions that are beneficial to consumers. Thus, protection of firms (new or old) invariably results in reduced, rather than increased, levels of competition. Once again, consumers pay the costs of such protection by paying higher prices.

Moreover, such protection cannot be justified by arguments concerning natural monopoly. If technological and demand conditions are such that the industry is not a natural monopoly, then a policy that protects new entrants by restraining the pricing decisions of the incumbent firm serves only to distort observed market shares away from efficient levels, thereby raising industry costs. If, on the other hand, the industry is a natural monopoly, then protection of new entrants also raises costs and only serves to prolong their inevitable exit. Consequently, the idea that regulation can, through protection of competitors, create or promote competition is completely without merit. The current policy of asymmetric regulation is economically indefensible whether natural monopoly conditions prevail or not.

The above discussion indicates that, through a variety of channels, asymmetric regulation serves to (1) hold industrywide prices and costs at artificially high levels, and (2) retard the rate of technological advancement. The lack of competitive vigor, the inefficient investment patterns, the potentially reduced rate of innovation, the unnecessary expenditures on administrative processes, and the overall protection of competitors all serve to make long-distance services more costly and less technologically advanced than they otherwise would be. This policy imposes regulatory costs that far exceed those required to deal with the perceived problem of residual monopoly power in the rural areas. As a solution to this problem, it is, in fact, a cure that is worse than the disease.

Why We Aren't Moving Ahead

Since divestiture has laid the structural foundation for deregulation, and since asymmetric regulation is so clearly flawed, the natural question that arises is: Why has public policy stalled in its progress toward a more rational approach? The failure of telecommunications policy to abandon the current ill-conceived regulatory framework in favor of a more enlightened treatment of this industry is attributable, no doubt, to a number of underlying causes. We have identified four that we believe go a long way toward explaining the observed policy inertia. We discuss each of these in turn.

The Ghosts of Deregulation

Efforts to loosen the regulator's grip on AT&T have been largely frustrated by concerns that certain undesirable consequences will follow deregulation. These concerns are due, in part, to natural fears that always surround change to a new and unfamiliar environment. They are also due, however, to concerted efforts on the part of those parties who stand to profit from a continuation of the existing regulatory system to conjure up certain ghosts of deregulation in order to forestall any relaxation of regulatory controls.[16]

It has been threatened that two principal economic ghouls will rise to haunt the deregulated long-distance telecommunications market. First, it is argued that predatory pricing will be used by the historically dominant supplier to drive its fledgling competitors from the market. And second, it is prophesied that the less-dense rural markets will remain subject to single-firm supply and be vulnerable to monopolistic exploitation for the foreseeable future. It is then concluded that the current system must be maintained as an amulet against these dire visions of anticompetitive performance. Each of these threatened spirits, however, is readily exorcised with straightforward economic analysis.

First, it is extremely unlikely that AT&T would engage in predatory pricing in a deregulated environment.[17] This conclusion is based on several important considerations. First, the interexchange telecommunications market currently exhibits relatively easy entry and low sunk costs. The same technological changes that have encouraged new firms to press regulators and legislators to relax entry restrictions have also provided the conditions necessary for potential competition to have a significant restraining influence on AT&T's behavior.[18] For example, the introduction of microwave transmission technology has reduced the overall costs of entry while, at the same time, it has increased the geographic mobil-

ity of the fixed assets required to provide service to a given market. Moreover, the ability of firms to lease transmission capacity and resell this capacity at the retail stage provides an extremely low sunk cost option for entry.[19]

Two implications follow from the resulting absence of significant barriers to entry. First, it is unlikely that the profits needed to finance predatory efforts will be forthcoming from any market. Even in those areas where actual entry may not occur immediately, potential entry will prohibit monopoly pricing. And second, even if successful predation should result in the elimination of all the firm's rivals from a given market, it will still fail to generate the postexit profits that would justify the predatory efforts. Even as the sole supplier, any attempt by the successful predator to inflate price above the competitive level will result in the entry (or reentry) of competing firms. Therefore, in the presence of easy entry, AT&T has neither the incentive nor the wherewithal to practice predatory pricing.

Two additional considerations reduce even further the likelihood that the predatory pricing ghost will materialize. First, given the rapidly changing technology within the telecommunications industry and the corresponding cost reductions, any remaining hope of future profits from predation by incumbent firms must be heavily discounted by the highly uncertain prospect that they will, in fact, be realized. And second, predatory pricing that is employed to eliminate competitors and obtain monopoly status is a flagrant violation of the U. S. antitrust laws. That is, a policy instrument already exists to protect the public from this sort of behavior.[20] It would be an extremely foolhardy strategy to employ in the postdivestiture deregulated telecommunications industry, which can only be described as a fishbowl. With consumer groups, regulators, academics, and politicians scrutinizing every aspect of the industry's performance, such behavior would be suicidal. Therefore, the current incantations that threaten the emergence of the predatory pricing ghost must be viewed with considerable suspicion as to their underlying motivation.

The second major ghost whose specter has frozen policymakers into a state of inaction is the ghost of market power in the rural areas. Here again, economic theory indicates that the feared effect is illusory. As we discussed above, the relative lack of entry into the rural areas may well be a manifestation of the pricing policies imposed by existing regulation; i.e., the observed pattern of entry may be due to cream skimming. If so, then deregulation and the resulting movement toward cost-based pricing will result in a broadened pattern of entry.

Moreover, even if deregulation does not result in rapid entry into the rural areas, AT&T would still lack the pricing discretion necessary to engage in monopolistic exploitation because of the absence of significant barriers to entry.[21] Where an alternative carrier has established a point of presence in a given area, any end office in that area can be served simply by ordering access from the local exchange company. No new physical facilities need to be constructed to reach any customer in the area. In addition, there are no significant barriers to prevent any carrier from establishing such a point of presence in any geographic area in which profit opportunities arise. As a result, the disciplining force of potential competition is strong, and even in those areas where AT&T remains the sole supplier, significant market power will not exist. The rural monopoly problem is simply another ghost that has been conjured up to haunt efforts to deregulate the industry.

Whining by Alternative Carriers

In addition to converting the regulatory hearing process into an economic seance, AT&T's competitors have had considerable success in forestalling the deregulation of their major competitor by describing, *ad nauseam*, the myriad problems they have faced in establishing a presence in the long-distance market. For example, a great deal of mileage has been derived from the unequal access that these carriers have been provided by the local exchange companies during the process of converting their switching equipment to accommodate multiple providers of the long-distance service. Due to the technical features of this equipment, it was not possible to provide non-AT&T carriers with access to the local network that was equal in quality to that provided AT&T at the time of divestiture. As a result, the new entrants have experienced certain technical (though not insurmountable) difficulties in achieving acceptable transmission quality and in providing service to customers with the older rotary dial telephones.

To moderate and, ultimately, alleviate this problem, public policy has responded in two ways. First, the divestiture order and subsequent rulings have required the local exchange companies to update their equipment over time so that equal access facilities would be made available to all long-distance carriers. A schedule of conversions by the Bell operating companies was specified by the court in the divestiture order, and the bulk of the remaining local telephone companies have received similar instructions in later rulings. Thus, the problem is being resolved. Second, during the transition period in which unequal access has remained a reality, regulators have attempted to counteract the economic consequences of unequal access by requiring the local companies to charge substantially discounted rates for the nonpremium access provided these alternative carriers.[22] Thus, while AT&T has received superior access facilities, they have had to pay a higher price for them.

Despite these judicial and regulatory attempts to nullify the economic consequences of unequal access, how-

ever, AT&T's competitors have vociferously complained of the problems experienced as a result of unequal access in virtually every docket in which regulatory reform has surfaced as an issue.[23] At the same time, it is obvious from both the number of new entrants and the remarkable growth in market share they have apparently enjoyed, that the problems these firms have encountered have not been sufficiently great to prevent them from competing successfully.

Because of this and a number of other difficulties they have experienced, however, the alternative carriers have argued that AT&T should continue to be subjected to traditional rate-of-return regulation.[24] The logical connection between the problem of unequal access and the conclusion that asymmetric regulation is in the "public interest" is far from obvious. If valid, this line of reasoning could be used to advocate rate base regulation of *any* firm that enjoys some particular advantage in any market whatsoever. For example, the firm that happened to build at an advantageous location should be regulated while its competitors remain free of regulatory controls. Or the farmer whose grandparents happened to settle on particularly fertile soil should be required to file rate requests with the public service commission. These and any number of other examples demonstrate the logical fallacy involved in this argument.

The fact is that every complaint concerning the difficulties experienced by AT&T's competitors can be (and has been) countered by a similar tale of woe by AT&T. For example, this company has been forced to pay premium access charges approximately 55 percent higher than its competitors for the superior access connections they have received. Moreover, AT&T has faced a plethora of regulatory constraints on pricing, new service offerings, service withdrawals, et cetera, that have not been imposed on their competitors. To the extent that regulatory bodies respond to such stories about the unique problems encountered by individual firms in their competitive struggles, the hearing process is transformed into a whining contest, the winner of which receives a favorable ruling as first prize.

The point is not which company faces the greatest obstacles but, rather, whether this market is competitive. All firms in all markets carry certain advantages and disadvantages with them onto the field of competitive play. All that rational public policy can or should do is ensure that the field is level — not that all competitors have equal size and offer identical products (and handicap those perceived to have some relative advantage). The ultimate goal is to see that the consumer is served by the competitive struggle — not to ensure that the score is tied at halftime.

The Perceived "Prudence" of Delay

An additional cause of public policy sluggishness is the perception held by many well-meaning policymakers that the prudent approach at the present time is to do nothing. According to this view, deregulation should be postponed until some of the uncertainties of the current state are resolved by the passage of time. Specifically, two sources of uncertainty exist that superficially appear to legitimize the "prudence" of delay. First, some parties remain honestly unconvinced of the vigor of competition and are somewhat naive about the role that regulation can play in promoting the growth of competition. Regulators are presently faced with conflicting arguments about the intensity of competition in the long-distance telecommunications industry. Parties seeking to relax regulatory controls argue that competition is intense and that market forces are sufficiently strong to ensure desirable performance on the part of all market participants. Other parties, seeking to maintain the status quo, argue that, while competition exists, it is far from perfect and that any relaxation of regulatory controls will lead to the exercise of monopoly power.

Regulators confronted with these opposing views and inexperienced in the analysis of market power are, then, uncertain about the true state of competition and are, consequently, unsure of the appropriate policy action. Frequently, the effect of such uncertainty has been to freeze regulatory policy in its current state. This sort of wait-and-see approach has been characterized by some as being prudent. But while it is appropriate to maintain regulatory controls until evidence of competition exists, to label any policy delays beyond that point as "prudent" is completely misleading. Such delays could only be justified if competition carried no benefits and regulation carried no costs. Since neither of these conditions holds, any delay in relaxing regulation in the presence of competition imposes costs on consumers while providing no compensating benefits.

Perfect competition is a theoretical ideal that is rarely, if ever, achieved in the real world. The basic efficiency properties of competition, however, are robust. That is, real world markets that are subject to interfirm rivalry that falls short of the perfect competition ideal tend to perform efficiently nonetheless. This fact, in conjunction with the significant costs of regulation, indicates that rate-of-return regulation should be relaxed when markets become workably competitive, which means that significant monopoly power is absent. In situations where rate-of-return regulation is maintained in the face of workable competition, the consumer is presented the worst of both worlds. The benefits of competition are denied while the costs of regulation continue to be imposed. It is extremely poor public policy.

A second source of uncertainly that is causing a "wait-and-see" attitude is that, despite the preponderance of policy measures which are predicated on the notion that competition is in the public interest, there remains some uncertainty about the long-run viability of competition

in the long-distance services industry. Specifically, some commentators have argued AT&T should not be subjected to relaxed regulation, because they believe that natural monopoly conditions still prevail in the interexchange telecommunications market. Whether the industry is a natural monopoly depends upon the long-run cost structure of providing the various services involved in telecommunications. This cost structure is extremely difficult to determine, given the present data and tools of analysis. As a result, various authorities who have attempted to empirically determine whether this industry is still subject to natural monopoly conditions have reached conflicting conclusions.[25] We tend to think, along with the majority of the students of the industry, that the cost and demand conditions that presently exist are fully capable of supporting a sufficient number of producers for competition to flourish. If so, then a policy of deregulation is clearly justified.

Suppose, however, that we (and a number of others) are wrong. Suppose, for the sake of argument, that the industry is a natural monopoly, that is, costs are, in fact, minimized under single firm supply. Then, the current policy of asymmetric regulation (where the firm that formerly held the position of a regulated monopolist is still regulated but is also subjected to competition from unregulated firms that are allowed free and selective entry) is totally indefensible on economic grounds. To allow entry only serves to increase the total costs of providing the overall service if the industry is, indeed, a natural monopoly. Consequently, society suffers increased costs if entry is permitted under these conditions. Moreover, to allow such entry to occur in the hope that, somehow, competition will be created is also economically indefensible. Permitting selective entry does not alter the underlying technology of supply, which is the ultimate determinant of whether natural monopoly conditions prevail.

Therefore, a policy of deregulation makes sense in either case. If the industry is capable of supporting competition, consumers will benefit from improved efficiency and reduced regulatory costs. If, on the other hand, the industry is naturally monopolistic, consumers will ultimately benefit from a return to single firm supply, which can only happen if all firms are allowed to compete on an equal footing. In the unlikely event that the latter occurs, then regulatory controls (with appropriate restrictions on entry) can be confidently restored.

The Self-interest of Regulators

If the modern theory of economic regulation teaches us anything, it is that regulators have a definite economic incentive to regulate. The opportunities provided by regulation to pass judgement on the pricing and investment decisions of the firm(s) subject to the regulator's jurisdiction are valuable assets that will not be surrendered lightly.[26] Commissioner salaries, staff sizes, perquisites, and postcommission employment opportunities are all enhanced by broadened regulatory authority. Consequently, while the various commissions responsible for regulating the long-distance telecommunications industry at both the state and the federal levels have regulatory authority over other industries — e.g., electricity at the state level and broadcasting at the federal level — they are nonetheless likely to resist vigorously any efforts to constrict the range of their regulatory powers.

For regulatory officials to embrace deregulatory policies, they must be convinced that the economic value of the political support gained through such an action exceeds the economic value of the regulatory controls forsaken. The fact that a number of state commissions have, in fact, largely deregulated the intrastate long-distance markets within their jurisdictions provides *prima facie* evidence that this condition has been perceived to exist in at least some locations. Moreover, the recent history of the Civil Aeronautics Board and the Interstate Commerce Commission (and, perhaps, the FCC) clearly indicates that proposals to deregulate an industry can arise from within the regulatory agency itself. These first two agencies, however, were infiltrated by noncareer regulatory appointees and staff with a mandate to implement deregulation policies. Regulators who anticipate a brief tenure within the agency obviously would discount the asset value of continuing regulation. Therefore, these examples do not contradict the basic postulate that regulators tend to favor regulation.[26]

Deregulation is the public officeholder's equivalent of a hostile takeover bid in the private sector. Regulatory "management" is replaced by the invisible hand of market forces. And just as stockholder interests are used to justify management resistance to a takeover, the "public interest" is employed as a vehicle to justify continued regulation.

Moreover, commissioners' resistance to deregulation is likely to be reflected (or even amplified) in commission staffs' positions. Public utility commission employees are often career civil servants who have developed technical skills in dealing with fairly narrowly defined regulatory issues. In addition, staff members associated with larger commissions tend to specialize in a particular industry. In fact, some commissions organize their staff along the lines of the industries they regulate, with separate divisions for electricity, transportation, and telecommunications. The market value of the human capital created by the regulatory process depends on the continuation of regulation.[28] With deregulation, much of that capital becomes unmarketable. Therefore, most commission staffs are equally unlikely to champion the cause of deregulation.

The opposition to deregulation found among regulatory commissions and their staffs is not likely to mani-

fest itself in overt ways. In other words, neither commissioners nor their staffs are likely to openly oppose deregulation on the grounds that their personal fortunes are at stake. Instead, the reluctance to abandon regulatory controls will generally be founded upon an expressed concern that the public interest will suffer in their absence.

This reluctance of regulators to deregulate is given additional plausibility by the manifest imperfections of competition itself. Real world markets do not typically conform to the frictionless and perfectly efficient norm of the textbook model of perfect competition. Of course, the regulatory process is at least equally flawed; but regulators tend to be far less aware of these imperfections. In part, this myopia may be attributable to the latter imperfections being far less visible. For example, how does one measure the innovations, productivity improvements, or price changes that would have taken place had competition been allowed? In addition, regulators often have a strong political mandate to pursue goals that may not be served by a competitive market. Thus, the regulator's distrust of competition has its roots in a complex mixture of social, political, and economic incentives.[29]

Moreover, contrary to the rather cynical impression that one gets in reading much of the economic literature on regulation, this expression of concern is, in our view, not likely to be artificial, false, or insincere. Given the complexity of the issues, the paucity of available information, the sometimes intentional obfuscation by opposing parties, and the inexperience of regulatory officials in wrestling with such abstract concepts as the degree of competition and barriers to entry, the latitude of ostensibly defensible positions is great. Under these circumstances, even totally unbiased decision makers could reach vastly divergent conclusions. But, given the economic self-interest of the regulator, the most likely outcome is one that involves a continuation of regulatory controls. That is, self-interest does not directly dictate the decision but, instead, tempers the receptiveness of the regulator to the arguments that he or she must confront. The end result, however, is the same — regulators are generally opposed to deregulation.[30]

Where We Should Be Going

Telecommunications policy is currently in a state of suspended animation, stalled halfway between regulated monopoly and deregulated competition. This hybrid policy, which we have referred to as asymmetric regulation, exhibits a number of undesirable features that all serve to increase the prices paid for the long-distance service. Thus, consumers lose under this regulatory framework. At the same time, this system serves the interests of two identifiable groups — the new firms that have entered this industry and the regulators who administer it. This coalition of advocates of the present policy has so far successfully delayed the implementation of significant deregulation.

Further progress probably will hinge on a number of events. First, procompetitive legislation in several states has forced regulatory commissions to confront the issue of unnecessary regulation. Moreover, many of these laws have specified explicit criteria for deregulation which are based upon the antitrust approach to the evaluation of the vigor of competition; e.g., market share and barriers to entry.[31] Thus, legislative initiatives appear likely to spur further deregulation, at least at the state levels.[32] Second, the experience of those states that have deregulated is currently providing strong evidence to alleviate fears that deregulation will yield undesirable consequences.

There has been no indication whatsoever that predatory pricing, exploitation of rural consumers, or other feared results have emerged in deregulated markets to date. Finally, the industry is experiencing important structural changes that will serve to remove further doubts that deregulation is in the public interest. As the alternative carriers complete their network construction programs, as AT&T continues to lose market share, and as the provision of equal access nears 100 percent, any vestiges of legitimacy for continued regulation quickly disappear. The only question at this point is how long the remaining regulators will be able to hold on to the atavistic policy of asymmetric regulation.

Endnotes

[1]Judge Harold Greene, who presided over the antitrust case and divestiture noted that "Once AT&T is divested of the local Operating Companies . . . it will be unable to subsidize the prices of its interexchange service with revenues from local exchange services or to shift costs from competitive interexchange services." In light of this the court concluded that "With the removal of these barriers to competition, AT&T should be unable to engage in monopoly pricing in any market." *United States v. American Teleph. & Teleg. Co.*, 48 PUR4th 227, 552 F.Supp. at 172 (D.D.C. 1982).

[2]State public utility commissions regulate intrastate long-distance calls while the Federal Communications Commission regulates interstate calls.

[3]Recently, calls for deregulation of the long-distance services provided by local exchange companies within their assigned areas have arisen. See, for example, Fowler, *et al* (1986), in References [below]. There are, however, important differences in the structure through which the long-distance services of the local exchange companies and the interexchange companies are provided. These differences, including ownership of the local exchange "bottleneck," suggest that deregulation should be considered separately for the local and interexchange companies. Here, we choose to focus on the latter, leaving the more difficult analysis of the former to future research.

[4]See Brock (1982) for a description of the historical evolution of public policy toward the telecommunications industry. A brief review of this evolution is also provided in Kahn (1984A).

[5]This growing divergence in urban and rural market shares has been verified in a number of studies performed in various states. For example, see "A Survey of Residential and Commercial Long Distance Telephone Customers in Texas," College of Business Administration, Texas A&M University, August 1986.

[6]As we argue below, the market power that AT&T is thought to possess in these regions is more apparent than real.

[7]In addition to pricing constraints there are equally important controls on the introduction of new services and pricing options. These, too, vary from one jurisdiction to another.

[8]See Kaserman and Mayo (1987A).

[9]It is not clear that a constraint requiring geographically uniform rates is binding. That is, the firm may well opt for this approach in the absence of any regulatory requirement to do so. Some evidence that geographically uniform prices would prevail in a deregulated environment is offered by the current pricing patterns of firms that are not currently subject to price regulations. These patterns, however, may be influenced by the regulatory controls applied to AT&T.

[10]MacAvoy and Robinson (1983) argue that observed entry in the long-distance market has been entirely motivated by cream-skimming opportunities created by the regulated pricing structure.

[11]Waterson (1984, Chapter 8) provides a survey of the economic literature on this subject.

[12]Alfred Kahn (1984B, p. 13) has referred to the current situation as the "equivalent of a Full Employment Act for microeconomists." The same statement would apply to regulatory lawyers as well.

[13]In this sense, participation in the regulatory process is much like providing green stamps. If only one firm does it, its profits increase. But when all firms do it, industrywide profits fall. Despite this unattractive outcome, however, all firms are driven to participate in the cost-raising activity. Unlike green stamps, however, participation in the regulatory tug-of-war does not benefit consumers. Instead, it is consumers and taxpayers that ultimately bear the costs of this diversion of resources from the market to the regulatory arena.

[14]Asymmetric regulation appears to maximize the incentives to engage in rent-seeking behavior. For a survey of the literature on rent seeking, see Tollison (1982).

[15]Landes and Posner (1981, pp. 975-976) emphasize the role that regulation plays in raising the firm's market share in certain areas: "Regulation may increase a firm's market share in circumstances where only the appearance and not the reality of monopoly power is created thereby. For example, in many regulated industries firms are compelled to charge uniform prices in different product or geographical markets despite the different costs of serving the markets. As a result, price may be above marginal cost in some markets and below marginal cost in others. In the latter group of markets, the regulated firm is apt to have a 100 percent market share. The reason is not that it has market power but that the market is so unattractive to sellers that the only firm that will serve it is one that is either forbidden by regulatory fiat to leave the market or that is induced to remain in it by the opportunity to recoup its losses in its other markets, where the policy of uniform pricing yields revenues in excess of costs. In these circumstances, a 100 percent market share is a symptom of a lack, rather than the possession, of market power."

[16]This discussion draws upon Kaserman and Mayo (1986).

[17]In the economics literature in general, allegations of predatory pricing — i.e., sightings — are viewed with considerable skepticism. This is due to the fact that, in order for the strategy to be profitable, several necessary (and rarely observed) conditions must be satisfied. At the same time, alleged sightings are not rare at all. This, of course, is due to the (entirely rational) tendency for firms whose profits have been reduced by the aggressive, yet legitimate, competitive pricing practices of their rivals to attempt to enlist the aid of regulators to combat this procompetitive behavior as well. Strategic use of false allegations may be highly profitable, particularly where the enforcement agencies involved are ill-equipped to distinguish legitimate from illegitimate claims. Since regulators are not generally well-versed on the economics of predatory pricing, they are susceptible to self-serving threats made by the alternative long-distance carriers that AT&T will engage in this sort of behavior if deregulation occurs.

[18]See Katz and Willig (1983) for a discussion of the entry conditions in the long-distance market.

[19]These resellers often utilize AT&T's transmission facilities due to the relatively attractive prices available. This use, however, does not prevent them from competing with AT&T for the revenues of final consumers, because several alternative sources of transmission capacity are available in most areas. An active and competitive wholesale market has arisen in this industry to supply the facility needs of these nonvertically integrated firms.

[20]Although the dominant thinking among the antitrust authorities and the courts is that predatory pricing is an extremely rare and unlikely business strategy (which, in our view, is correct), the threat of prosecution in the event it does occur remains present. This is especially true of a firm with the visibility of AT&T.

[21]It is interesting to note that Judge Greene considered, and dismissed, the concern over monopoly power in the rural areas: "To be sure, there are a number of routes for which AT&T is the sole interexchange carrier. However, several of these routes serve sparsely populated areas and appear to be only marginally profitable. On the other hand, should it turn out that AT&T is nevertheless charging monopoly prices, then, following divestiture, market forces should fairly rapidly remedy the situation: because of the elimination of entry barriers, new entrants will be attracted to these markets, and prices, in turn, will fall to their competitive levels." *United States v. American Teleph. & Teleg. Co.*, 48 PUR4th 227, 552 F.Supp. at 172 (D.D.C. 1982).

[22]It is possible to conceive of a differential charge — either a premium to AT&T or a discount to the alternative carriers — which is exactly equal to the opportunity cost associated with premium access connections. The ideal way to determine the value of the premium access would be to open the rights to the premium access to competitive bidding. In this way a competitive market is maintained despite different quality of inputs across the various competitors. Such an auction would be akin to the process by which farmers bid up the price — i.e., pay a premium — for higher quality land. Unfortunately, such an auction is not technologically possible in the case of telecommunications. As a result, the FCC has relied on a combination of industry comments, economic analysis, and seat-of-the pants judgement to determine the access charge differential. Whether the differential has been set at the conceptually correct level is a matter of ongoing debate. Nevertheless, the expressed goal of setting the differential was "to ensure that an appropriate competitive balance is maintained during the transition." (FCC Memorandum and Order, CC Docket No. 78-72, Phase I, Adopted July 27, 1983, p. 52.)

[23]The list of specific complaints that the alternative carriers have raised is quite long. It stands as testimony to the imaginative capabilities of these firms and their counsel in devising arguments that ostensibly warrant a continuation of regulatory controls over AT&T. For an example of this, see the *Joint Petition for Expedited Rulemaking*, GTE Sprint Communications Corporation et.al., before the Federal Communications Commission, June 17, 1985. This document has been aptly dubbed the "whining petition."

[24]MCI Telecommunications Inc., recently reversed itself on this issue, at least at the federal level. See Schwadel (1987). The company's expressed concern was that the FCC has been forcing AT&T to reduce its interstate rates more rapidly than the firm would choose to do if deregulated. Apparently, the threat of what might be termed "predatory regulation" exceeds the fear of predatory pricing by AT&T. Opponents of deregulation, who interpreted MCI's earlier opposition to the relaxation of regulatory controls over AT&T as evidence that predatory pricing would occur, now interpret their endorsement of deregulation as evidence that umbrella pricing will follow. The upshot is that, regardless of MCI's position, it is viewed by regulators as evidence of a need for continued regulation.

[25]For example, compare Phillips (1982) and Evans and Heckman (1983).

[26]For the seminal works that develop this view, see Stigler (1971), Posner (1973), and Peltzman (1976).

[27]The economic theory of regulation also explains why someone who is allegedly representing consumers before the regulatory body — e.g., a state's Office of Consumer Counsel or the Consumer Federation of America — might advocate a continuation of regulatory controls under circumstances in which deregulation is likely to result in lower prices. Under these conditions, the representative of the consuming public is placed in the awkward position of either doing his or her job, and thereby losing it, or failing to do the job and thereby keeping it.

[28]For example, one highly skilled in the administration of the arcane Separations and Settlements procedures would likely have a hard time marketing this talent in the private sector.

[29]Kahn (1971, Chapter 7) discusses these issues.

[30]In the public sector, one often encounters "cautious deregulators," the definition of which is a person who favors deregulation but not within his or her own lifetime.

[31]Kaserman and Mayo (1987B) surveys various states' approaches to the analysis of market power in the intrastate long-distance business.

[32]Quite the opposite situation appears to exist at the federal level. The U. S. Congress has been a major obstacle to the deregulation of interstate calls.

References

Brock, Gerald. *The Telecommunications Industry*. Cambridge, Mass.: Harvard University Press, 1981.

Evans, David S. and James J. Heckman. "Natural Monopoly." In David S. Evans (ed.), *Breaking Up Bell: Essays on Industrial Organization and Regulation*. New York: North Holland, 1983.

Fowler, Mark, Albert Halprin, and James Schlichting. "'Back to the Future'; A Model for Telecommunications." *Federal Communications Law Journal* 38, no. 2 (August 1986): 145-200.

Kahn, Alfred E. *The Economics of Regulation*, Vol. 2. New York: John Wiley & Sons, Inc., 1971.

———. "The Road to More Intelligent Telephone Pricing." *Yale Journal on Regulation* 1, no. 2 (1984A): 139-157.

———. "The Next Steps in Telecommunications Regulation and Research." PUBLIC UTILITIES FORTNIGHTLY, Vol. 114 No. 2, July 19, 1984B: 13-18.

Kaserman, David L. and John W. Mayo. "The Ghosts of Deregulated Telecommunications: An Essay By Exorcists." *Journal of Policy Analysis and Management* 6, no. 1 (Fall 1986): 84-92.

———. "Market Based Regulation of a Quasi-Monopoly: A Transition Policy for Telecommunications." *Policy Studies Journal* 15, no. 3 (March 1987A): 395-413.

———. "Deregulation and Market Power Criteria: An Evaluation of State-level Telecommunications Policy." Paper presented at University of Texas Conference on Telecommunications Policy, September 1987B.

Katz, Michael and Robert Willig. "The Case for Freeing AT&T." *Regulation* (1983): 43-49.

Landes, William and Richard Posner. "Market Power in Antitrust Cases." *Harvard Law Review* 94, no. 5 (1981): 937-995.

MacAvoy, Paul and Kenneth Robinson. "Winning by Losing: The AT&T Settlement and Its Impact on Telecommunications." *Yale Journal on Regulation* 1, no. 1 (Fall 1983): 1-43.

Nelson, Sharon. "Washington State's New Regulatory Flexibility Act." PUBLIC UTILITIES FORTNIGHTLY, Vol. 117 No. 1, January 9, 1986: 29-33.

Peltzman, Sam. "Toward a More General Theory of Regulation." *Journal of Law and Economics* 19 (August 1976): 211-240.

Phillips, Almarin. "The Impossibility of Competition in Telecommunications: Public Policy Gone Awry." In Michael Crew (ed.), *Regulatory Reform and Public Utilities*. 1982.

Posner, Richard A. "Theories of Economic Regulation." *Bell Journal of Economics and Management Science* 4 (Autumn 1974): 335-358.

Schwadel, Francine. "MCI is Easing Stance on AT&T Deregulation." *Wall Street Journal*, March 5, 1987: 4.

Stigler, George. "The Theory of Economic Regulation." *Bell Journal of Economics and Management Science* 2 (Spring 1971): 2-21.

Tollison, Robert. "Rent Seeking: A Survey." *Kyklos* 35, no. 4 (1982): 575-602.

Waterson, Michael. *Economic Theory of the Industry*. Cambridge: Cambridge University Press, 1984.

IS THE "DOMINANT FIRM" DOMINANT? AN EMPIRICAL ANALYSIS OF AT&T'S MARKET POWER

by

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January 1995

The authors would like to thank John Jackson for his assistance in the conceptualization and specification of the econometric model.

"nondominant" firms) , while retaining more stringent regulatory controls over firms that had "substantial opportunity and incentive to subsidize the rates for more competitive services with revenues obtained from its monopoly or near-monopoly services." (the "dominant" firms).[3] Clearly, then, the classification decision was to hinge on the degree of market power held by the various firms under the FCC's jurisdiction.

This classification of interexchange companies into dominant or nondominant categories has had substantive implications for the degree of regulatory control of the firms in this industry. Specifically, for firms found to be nondominant, the FCC has relinquished virtually all direct regulatory control over pricing and investment decisions.[4] In contrast, where a firm is classified as dominant, the extent of regulatory control is considerably greater. Indeed, for the sole interexchange company classified as dominant--AT&T--complete rate-of-return regulation was imposed until 1989. Although a price-cap regulatory scheme was enacted for AT&T in that year, this firm continues to be uniquely classified as the sole "dominant" carrier in the interchange marketplace. And, on the basis of that classification, there continues to be a substantial asymmetry between the regulatory controls applied to AT&T and its competitors.[5]

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[3] Federal Communications Commission, First Report and Order, CC Docket No. 79-252, p.6. Elsewhere in the same Report and Order, the Commission indicated that carriers would be classified "as dominant or non-dominant depending upon their power to control prices" (p.10).

[4] Indeed, the FCC went so far as to abandon the requirement that nondominant firms file tariffs with the Commission. This decision was, however, recently found by the Supreme Court to violate the Federal Communications Act of 1934, which requires the filing of such tariffs for all telecommunications companies providing interstate services.

[5] This asymmetric regulation has been severely criticized. See Kaserman and Mayo (1988). Others, e.g., Shepherd (1993) have defended the perpetuation of the current framework.

regulatory decisions and legislative proposals ranging from relaxed regulation of this firm to removal of the MFJ restriction on entry by the Bell Operating Companies (BOCs) into the interLATA market. No other question is likely to have as profound an effect on our public policy toward this industry in the coming years.

To date, however, virtually all evaluations of AT&T's market power have been based upon a more-or-less traditional antitrust analysis of the market structure within which this firm operates.[8] That is, these evaluations have relied upon evidence pertaining to such structural characteristics as market share and barriers to entry to reach judgmentally-based conclusions about the degree of control over price that AT&T is likely to possess in a deregulated environment. To a large degree, the substantial differences of opinion that have emerged may be traced to different implicit weights that the individual economists and regulatory agencies have attached to these various structural attributes (e.g., market share versus entry conditions) and divergent expectations with respect to the likelihood of concerted action on the part of firms in this industry.

A more modern empirically-based approach to the evaluation of market power, however, has emerged in the economics literature over the past decade.[9] Several alternative econometric techniques have been introduced to estimate the extent to which individual firms' output decisions influence market price. Implementing one or more of these techniques can, under certain conditions, yield an estimate of the price elasticity of the individual firm's

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[8] See, e.g., Kaserman and Mayo (1988); Shepherd (1993); Porter (1993); Hall (1993); and Kaserman and Mayo (1994). In a different vein, Ward (1993) provides an econometric approach.

[9] See, e.g., the papers included in the issue-length conference on "Empirical Approaches to Market Power," Journal of Law and Economics Volume 32 (October 1989).

The paper is organized as follows. First, given the potential for confusion stemming from alternative meanings of the term "dominant," Section II provides a clarification of the alternative uses to which this term has been put. Next, in Section III, we describe various conceptual considerations related to formulation of the empirical model. In Section IV, we provide a description of the data and present our estimation results. The residual demand elasticity estimates and market power calculations are then reported and interpreted in Section V. Section VI presents our empirical results concerning the tacit collusion issue. Finally, we conclude the paper with Section VII.

II. Alternative Meanings of the Word "Dominant"

Debates on any topic are ill served by the use of imprecise language, and debates about technical issues such as market power are particularly difficult to resolve when participants implicitly employ different definitions of a common term. This problem of divergent definitions has plagued discussions involving use of the word "dominant" both in the economics literature and public policy forums for many years. Moreover, because the term "dominant" has become a cornerstone of telecommunications policy over the past decade, it is important to establish a clear definition of this word at the outset.

Although the term is generally understood to apply to a firm that is large relative to the other firms in the market, there is a distinct difference of opinion about what this comparative size implies about the degree of control the firm labeled as dominant is able to exercise over market price. Specifically, two groups of analysts have attached very different meanings to this word. One group equates the phrase "dominant firm" to a producer that

The dominant firm takes the anticipated reaction of the fringe into account in making its pricing decisions, but the fringe fails to incorporate the dominant firm's reactions in their own output choices. In a purely oligopolistic industry, however, there are comparatively few industry participants (each holding a relatively large market share). Under such circumstances, true mutual interdependence is likely to be present. Accordingly, all firms anticipate and respond to the expected actions and reactions of rival producers, and, as a result, strategic or game theoretic considerations become a central feature of modeling behavior in these industries.

More importantly, as Saving (1970) and Landes and Posner (1981) have shown, in the DF/CF model there is no a priori presumption of significant market power on the part of the dominant firm. Rather, the extent of control this firm exercises over price in this model is an open question, where the answer hinges not only on market share but also on market demand and fringe supply elasticities. Thus, while both groups apparently agree that, to be classified as a dominant firm, a producer must have a relatively large market share, they disagree on whether that share necessarily implies economically significant market power. In this paper, we employ the second, less pejorative definition. We will assume that AT&T is a dominant firm in the sense of the DF/CF model and examine empirically whether it holds significant market power (i.e., whether AT&T is "dominant" under the alternative definition.)

III. Conceptual Considerations and the Empirical Model

What Bresnahan (1989) labels the "new empirical industrial organization" (or NEIO) is largely concerned with estimation of econometric models of individual industries for the

requires identification of exogenous variables that shift one firm's marginal costs without affecting the costs of other firms in the industry. Firms competing in the long distance market, however, all purchase essentially the same set of inputs at roughly equivalent prices.[17] Consequently, AT&T has not experienced the sort of cost shifts that would allow identification of its residual demand curve from the available data.[18] And second, because of continued regulation of this firm' pricing decisions, it cannot be assumed that the company is located at a profit-maximizing equilibrium over the sample period.[19] As a result, the first-order condition that provides the theoretical link for connecting residual demand elasticity to the Lerner index is unlikely to be satisfied here.

Therefore, both the nature of this industry's data and conceptual difficulties caused by continued regulation prevent us from direct estimation of AT&T's residual demand curve. A

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[17] In the period immediately following divestiture, access to the local exchange carriers' networks offered to AT&T's competitors was inferior in quality to that provided to AT&T. Under FCC and state public utility commission rules, a discount for this inferior access, generally equal to 55 percent, was applied to the "non-premium" access purchased by AT&T's competitors. This created a cost asymmetry between AT&T and its competitors. Under the "equal access" provisions of the Modification of Final Judgment, however, the BOCs now provide equal access arrangements in the overwhelming preponderance of their exchange offices. As a result, the prices paid for access by the various interexchange companies has converged rapidly over time. Given the widely available supply of the other inputs necessary to provide long distance service, no other sources of cost differences or cost shifts that uniquely affect AT&T can be identified that would permit an "off-the-shelf" estimation of the residual demand curve along the lines identified by Baker and Bresnahan (1992).

[18] The absence of these necessary cost shifts and the resulting inability to estimate residual demand directly in this industry are alluded to in Taylor and Taylor (1993, p. 189). Here, these authors state that: "... we were unable to estimate individual-firm elasticities. These results may be due to poor price data and limited independent variation in those data for AT&T and its competitors ..."

[19] Empirical evidence suggests that continued relatively stringent regulation of this firm has caused it to charge higher rates than it voluntarily selects under more relaxed regulation. See Mathios and Rogers (1989) and Kaestner and Kahn (1990).

widespread adoption of fiber optic transmission facilities. Such increased homogeneity is evidenced in the marked convergence of the prices charged by the various competitors since divestiture.[22] Given this close correspondence between the assumptions of the DF/CF model and the structural attributes of the industry, utilization of this model to evaluate AT&T's market power seems to be a sound approach.[23]

Given the DF/CF model, the residual demand curve faced by AT&T is given by the total market demand curve minus the collective supply curve of the competitive fringe, i.e.

$$Q_{ATT}(P) = Q_M(P) - Q_F(P), \tag{1}$$

where P is the price of long distance service, $Q_{ATT}(P)$ is AT&T's residual demand, $Q_M(P)$ is market demand, and $Q_F(P)$ is fringe supply. Due to the price-taking behavior exhibited by fringe producers, $Q_F(P)$ is given by the collective marginal cost curve of these firms. As shown by Saving (1970), equation (1) may be manipulated to obtain the dominant firm's residual demand elasticity as a function of three underlying structural parameters:

where η_{ATT} is AT&T's residual demand elasticity, η_M is the market demand

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[22] Evidence of such convergence is provided in Kaserman and Mayo (1994).

[23] Indeed, the framework adopted here increasingly appears to constitute the theoretical underpinnings for the development of federal regulatory policy. For instance, in the recent FCC order eliminating price regulation of the commercial long-distance services of AT&T, the Commission relied upon virtually all of the DF/CF criteria. See *Report and Order* (CC Docket No. 93-197), Released January 12, 1995. Our approach, then, is perfectly congruent with the evolving federal regulatory policy. Whereas the Commission has to date relied upon qualitative indicators, we are able to provide quantitative measurement of the degree of market power.

access tends to reduce the costs of fringe producers providing long distance service. Hence, we expect $\partial P_F/\partial EA < 0$.

Finally, because fringe supply is expected either to slope upward or to be horizontal, $\partial P_F/\partial Q_F \geq 0$ should hold. It is this last parameter, of course, that is the primary focus of our attention, because it reveals the ability and willingness of AT&T's competitors to enter and expand in response to any attempted price increases. That ability, in turn, is a primary determinant of AT&T's market power. The closer this parameter is to zero (i.e., the more elastic is fringe supply), the lower are barriers to entry and expansion and, therefore, the greater the intensity of potential competition. Conversely, a large positive coefficient on Q_F would indicate a relatively inelastic fringe supply with comparatively ineffective potential competition.

Turning to the inverse market demand function for long distance service, we specify:

$$P = P_M(Q_M, P_L, PHONE, PHONESQ, Y, D_i), \qquad (4)$$

where Q_M is the market quantity, P_L is a n index of real prices for local telephone service, PHONE is the number of U.S. households that subscribe to telephone service, PHONESQ is the square of PHONE, Y is real per capita income, and D_i is a vector of three quarterly dummies. We expect market demand to slope downward. We expect increases in the price of local telephone service to reduce the demand for long distance service due to the complementary nature of these products.[24] We expect increases in household subscribership

[24] Hausman, Tardiff, and Belinfante (1993) report empirical evidence of such complementarity.

TABLE 1

Variable Names and Definitions

Variable Name	Definition	Sources
Q_M	Interstate switched access minutes of all long distance carriers	(2)
P_L	Real consumer price index for local telephone service (1982 - 1984 = 100)[1]	(1)
PHONE	Number of households with telephone service, measured in millions	(2)
PHONESQ	PHONE * PHONE	
Q_F	Interstate switched access minutes by carriers other than AT&T	(2)
PA	Real price of total access charges per conversation minute[2]	(1)
P	Average daytime real price of AT&T's long distance interstate telephone service for a 10 minute 200 mile call[3]	(1)
EA	Percentage of total industry lines converted to equal access	(2)
Y	Real disposable per capita income[4]	(3)
D_i	Quarterly dummies, i = 2, 3, 4	

SOURCES:

(1) Reference Book: Rates, Indexes, and Household Expenditure for Telephone services. Industry Analysis Division, Common Carrier Bureau FCC, May 1993.

(2) Statistics of Communications Common Carriers, FCC 1991/1992 edition.

(3) Economic Report of the President, 1985-1994 editions. United States Government Printing Office, Washington.

[1] P_L is calculated by deflating the nominal consumer price index for local telephone service with the consumer price index for all goods and services.

[2] P_A includes originating carrier common line charges, terminating carrier common line charges, and traffic sensitive charges. Note also that P_A is calculated by deflating nominal access charges with the implicit price deflator.

[3] Real prices are calculated by deflating nominal prices with the implicit price deflator.

[4] Real per capita income is calculated by dividing nominal per capita income with the implicit price deflator (1982 = 1).

Results obtained from estimating the fringe supply curve in linear form with two-stage least squares (2SLS) are reported in Table 2.[25] These results are very encouraging. The explanatory power of the model is quite high, and all coefficients attain the expected signs. Moreover, all parameters are statistically significant. The positive sign on the coefficient of Q_F indicates an upward-sloping fringe supply. The positive sign on the coefficient of PA suggests that fringe supply shifts backward with increases in access charges. The negative sign attached to the coefficient of EA confirms our expectation that the provision of equal access increases fringe supply.

Most important, the 2SLS results produce a fringe supply elasticity estimate of 4.38 at the sample means. Thus, our results suggest a large supply response to a price change on the part of fringe firms in this industry. This finding, in turn, is consistent with prior arguments that have posited an absence of significant barriers to entry and expansion in this industry.[26]

Next, Table 3 reports our estimation results for the interstate long distance telecommunications market demand function using 2SLS.[27] Here, too, the results appear to be quite reasonable. The model exhibits considerable explanatory power, and all hypothesized coefficient signs are obtained. Moreover, all coefficients except the second-quarter dummy are significant at the .05 level or higher. These results confirm a downward-

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[25] The model was also estimated with three-stage least squares (3SLS). Because the 3SLS results are virtually identical to the 2SLS results, we report only the latter here.

[26] Katz and Willig (1983), Porter (1993), and Kaserman and Mayo (1988) have made such arguments.

[27] This equation is also estimated here in linear form. A double-log specification was estimated as well, but the results are essentially the same as those reported here. Additionally, the equations were estimated using three-stage least squares, with no substantive changes from the results reported here.

of approximately 62 percent, while Haring and Levitz (1989) report that AT&T's share of industry assets is equal to 40 percent.

Thus, given these two alternative values of S_{ATT}, we can substitute the estimated values of ε_F and η_M into eq. (2). These substitutions yield values of AT&T's residual demand elasticity of -3.48 and -7.81, for the output-based and capacity-based market shares, respectively. The corresponding values of the Lerner index, then are 0.29 and 0.13. Given that the theoretical range of the Lerner index is from zero to unity, the relatively low values of these estimates suggest that AT&T has no significant market power in the pricing of long distance services.[30]

These figures, however, are somewhat difficult to interpret in isolation. To gain a better perspective on what these numbers imply, it is useful to compare them with similar estimates for other industries. Two recent studies provide a basis for such comparison. First, a paper by Hall (1988) reports estimates of the ratio of marginal cost to price for 26 U.S. industries. He labels this ratio ß. Given the definition of the Lerner index, λ, and the definition of ß, Hall's estimates can easily be transformed into estimates of the Lerner index for these industries. Specifically, $\lambda = (P - MC)/P = 1 - ß$. Table 4 reports the results of this simple transformation of Hall's estimates along with the corresponding estimates of the implied residual demand elasticities.

(1987, pp. 7-8) argues that a capacity-based share is more meaningful in the long distance telecommunications market.

[30] Interestingly, Ward (1993) uses an alternative econometric model and different data to quantify the magnitude of AT&T's own-price elasticity and its associated Lerner index with very similar results to those reported here.

Comparing these estimates to our estimates for AT&T, we find that, relative to industries such as Paper and Allied Products, Chemicals and Allied Products, and Electrical and Electronic Products (none of which are price regulated), AT&T possesses remarkably little market power. The mean value of our Lerner index estimates for AT&T is 0.207, while the mean of the 22 industries for which Hall's estimates fall within the theoretically acceptable range (i.e., for which $0 \leq \lambda < 1$) is 0.62. Thus, on average, our estimates suggest that AT&T holds substantially less market power than exists in these other industries. Moreover, the maximum estimate of λ we obtain for AT&T is 0.29. This value is below every single industry in Hall's sample except one (Instruments Related Products) that generated a Lerner index value within the acceptable range. Thus, relative to these other industries (all of which are unregulated), AT&T appears to face very effective competition.

Finally, Bresnahan's (1989) survey of prior empirical studies of market power in individual industries (examples of the NEIO) presents a table summarizing the Lerner indices estimated by various authors (Table 17.1, p. 1051). That table is reproduced here as Table 5. Almost a dozen industries are represented. The range of estimated market power is quite broad, with the Lerner index ranging from a low of 0.025 to a high of 0.88. Nonetheless, our estimates of AT&T's Lerner index clearly fall toward the low end of the reported indices. The mean Lerner index in Table 5 is 0.296, which is slightly above even our maximum estimate for AT&T.

Thus, this comparison also supports the conclusion that, relative to other firms in the U.S. economy, AT&T possesses very little market power. While it may be a dominant firm in the theoretical sense envisioned in the DF/CF market model, it is not dominant in the sense

used by regulators for classification purposes.

VI. A Test for Tacit Collusion

An issue that is closely related to the ongoing concern about the degree of unilateral market power held by AT&T is whether the long distance industry has recently evolved into a tacitly collusive oligopoly characterized by price leadership and stable market shares among the three largest firms. Proponents of this argument point to two recent developments to support the inference of tacit collusion.[31] First, beginning in 1989, at the same time the FCC altered the way in which it regulates AT&T from traditional rate-of-return controls to price caps, AT&T's market share began to stabilize on a minutes-of-use basis. And second, in 1993, AT&T announced its first price increase since divestiture, and MCI and Sprint appeared to follow those increases. While neither of those events, either alone or in combination, is theoretically sufficient to support a claim of tacit collusion, both are conceivably consistent with a general decline in the intensity of competition in this industry.[32]

A complete assessment of this issue is beyond the scope of this paper. Nonetheless, given the econometric model presented above, it is possible to develop a simple empirical test of the tacit collusion argument. Such a test focuses on the slope of the fringe supply curve in

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[31] See, e.g., "Affidavit of Paul W. McAvoy" in the District Court for the District of Columbia, United States of America v. Western Electric Company, Inc., and American Telephone and Telegraph Company, June 22, 1994.

[32] At the same time, they are also both consistent with other explanations based upon competitive market performance.

$$\beta_0 = \delta_0 + \delta_1 C \tag{6}$$

and

$$\beta_1 = \alpha_0 + \alpha_1 C \, . \tag{7}$$

Substituting equations (6) and (7) into equation (5), we have

$$P = \delta_0 + \delta_1 C + \alpha_0 Q_F + \alpha_1 C \cdot QF + \beta_2 PA + \beta_3 EA \tag{8}$$

If tacit collusion emerged in this industry in 1989, then the shift parameters δ_1 and/or α_1 should be statistically significant.

Table 6 reports the results obtained from estimating equation (8) with 2SLS.[33] Both of the estimated shift parameters are insignificant. Moreover, none of our prior results are materially altered by the inclusion of these variables. Therefore, the empirical evidence fails to support the claim that tacit collusion has emerged in the long distance telecommunications industry. We can detect no significant change in the supply response of the competitive fringe firms in this market since the introduction of price cap regulation that would indicate any lessening of the intensity of competition faced by AT&T.

VIII. Conclusion

At divestiture, considerable debate emerged concerning the long-run viability of competition in the long distance telecommunications industry. In the decade since divestiture,

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[33] Both Q_F and $C \cdot Q_F$ are treated as right-hand endogenous variables in this estimation. The model was also estimated with three-stage least squares (3SLS). Because the 3SLS results are virtually identical to the 2SLS results, we report only the latter.

that debate has continued unabated and has recently been invigorated by the BOCs' appeals to be allowed to reenter the interLATA long distance market and their claims regarding the intensity of competition in that market. To date, however, the arguments presented have proceeded primarily on a priori theoretical grounds pertaining to conditions of natural monopoly and largely ad hoc analyses of the emerging structural characteristics of the industry. While evidence of this nature is valuable in attempting to resolve this important public policy issue, it is important to attempt to corroborate such information with empirical studies as the requisite data become available.

In this spirit, we have employed the DF/CF model to estimate both fringe supply and market demand elasticities in the interstate long distance telecommunications market. We have employed the resulting elasticity estimates along with prior information on AT&T's market share to calculate empirical estimates of AT&T's market power. Our estimates indicate that AT&T's residual demand elasticity is between -3.48 and -7.81, resulting in Lerner index values between 0.29 and 0.13, respectively. Comparison of these values with prior Lerner index estimates for firms in other industries suggests that, relative to these other (unregulated) industries, the long distance market is highly competitive.

Additionally, we were able to modify the model to examine the recent allegations that the competitive performance in the long-distance marketplace has been compromised by the emergence of a tacitly collusive pattern of price leadership. Specifically, within the context of the model examined, support for such a claim may arise from a dimunition in the elasticity of supply of competitors to AT&T. An empirical test of the data reveal no such change in the propensity of competitors' responsiveness to price and profit opportunities in the

assessment of the benefits and costs of those restraints. While a complete assessment of those benefits and costs is beyond the scope of this paper, the clear evidence to emerge in this paper that the long distance market is effectively competitive suggests that the benefits, if any, from additional entry into the interexchange business are likely to be very limited. At the same time, the risks of monopoly leveraging (that have been documented elsewhere)[34] impose costs of removing the current MFJ line-of-business restrictions. Accordingly, our results suggest that the restrictions be maintained until such time as the monopoly power which provides the fulcrum for monopoly leveraging is eliminated.

[34]See Kaserman and Mayo (1993).

Hall, Robert E. "Long Distance: Public Benefits from Increased Competition," mimeo, Applied Economics Partners, Menlo Park, CA, 1993.

Haring, John and Kathleen Levitz, "What Makes the Dominant Firm Dominant?" Working Paper, Office of Plans and Policy, Federal Communications Commission, 1989.

Hausman, Jerry, Timothy Tardiff, and Alexander Belinfante, "The Effects of the Breakup of AT&T on Telephone Penetration in the United States," American Economic Review, Vol. 83 (May 1983), pp. 178-184.

Hovenkamp, H. "Antitrust Analysis of Market Power with Some Thoughts about Regulated Industries," in Telecommunications Deregulation: Market Power and Cost Allocation Issues, J. R. Allison and D. L. Thomas, editors, Cambridge, MA: Ballinger Publishing Company, 1987.

Kaestner, R. and B. Kahn, "The Effects of Regulation and Competition on the Price of AT&T Intrastate Telephone Service," Journal of Regulatory Economics, Vol. 2 (1990), pp. 1-15.

Kaserman, David L. and John W. Mayo, Leveraging Theory: Implications for Post-Divestiture Telecommunications Policy, Center for Business and Economic Research, University of Tennessee, March 1993.

Kaserman, David L. and John W. Mayo, "Long Distance Telecommunications Policy: Rationality on Hold," Public Utilities Fortnightly, Vol. 122 (December 22, 1988), pp. 18-27.

Shepherd, William G. "Long-Distance Telephone Service: Dominance in Decline?" in Industry Studies, Larry L. Duetsch, ed., Englewood Cliffs, NJ: Prentice Hall, 1993, pp. 342-363.

Stigler, George J. "The Dominant Firm and the Inverted Umbrella," Journal of Law and Economics, Vol. 8 (October 1965), pp. 167-172.

Taylor, Lester D. "Pricing of Telecommunications Services: Comment or Gabel and Kennet," Review of Industrial Organization, Vol. 8 (1993), pp. 15-19.

Taylor, Lester D. Telecommunications Demand in Theory and Practice, Boston, MA: Kluwer Academic Publishers, 1994.

Taylor, William E. and Lester D. Taylor, "Postdivestiture Long-Distance Competition in the United States," American Economic Review, Vol. 83 (May 1993), pp. 185-190.

Temin, Peter The Fall of the Bell System (New York: Cambridge University Press) 1987.

Ward, Michael R. "Market Power in Long Distance Telecommunications," mimeo, 1993.